

Abstract Submitted
for the SHOCK13 Meeting of
The American Physical Society

Measurements of Residual Stress in Shocked Samples USHA

CHANDRA, Department of Physics, University of Rajasthan, Jaipur 302004 India, G. PARTHASARATHY, National GeoPhysical Research Institute (CSIR), Hyderabad 500606 India, N.V. CHANDRA SHEKAR, P.CH. SAHU, Materials Science Group, IGCAR, Kalpakkam 603102 India — Study of meteorites not only indicates the place of origin but also carry precious secrets about the formation of the solar systems. Impact chronology of Howardite-eucrite -diogenite (HED) meteorites derived from vesta-4 asteroid indicates occurrence of many significant collisions-the major impact between 4.1 and 3.5 Ga as recorded by ^{40}Ar - ^{39}Ar shock ages of HED. Howardite meteorite which fell at Lohawat village in Jodhpur district (Rajasthan) was studied under up to 9 GPa using diamond anvil cell through in-situ x-ray diffraction and Mössbauer spectroscopy supported by electrical conductivity measurements using WC anvil cell. EPMA analysis indicated the presence of orthopyroxene ($\text{Fs}_{64.91}\text{En}_{34.13}\text{Wo}_{0.96}$) and plagioclase ($\text{An}_{94.63}\text{Ab}_{5.37}$). All the three techniques showed pressure induced structural variation at 2.8 GPa and 5.6 GPa representing irreversible amorphization and reversible crystallization respectively which could be explained based on the high pressure behaviour of anorthite and orthopyroxene. The lower value of phase transition for the meteorite sample to that of pure end members indicate preservation of residual stress. High pressure studies, therefore would be useful in estimating the residual peak shock pressure experienced by the parent body.

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Date submitted: 27 Feb 2013

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